

Europäisches Patentamt  
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(11) EP 1 220 580 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:  
25.08.2004 Bulletin 2004/35

(51) Int Cl.7: H05B 41/282, H05B 41/285

(43) Date of publication A2:  
03.07.2002 Bulletin 2002/27

(21) Application number: 01130174.4

(22) Date of filing: 19.12.2001

(84) Designated Contracting States:  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR  
Designated Extension States:  
AL LT LV MK RO SI

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(30) Priority: 28.12.2000 JP 2000402001

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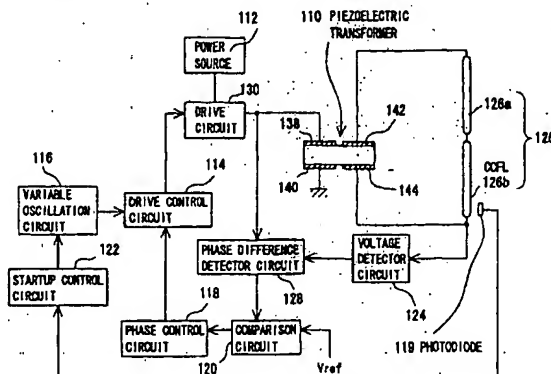
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(54) Drive device and drive method for a cold cathode fluorescent lamp

(57) The present invention relates to a drive device for one or more series-connected cold cathode fluorescent lamps having an electrical terminal at each end. The drive device has a piezoelectric transformer for converting by means of the piezoelectric effect a primary ac input applied to primary electrodes to a secondary ac output, which is removed from secondary electrodes; a drive arrangement for applying the primary ac input to the primary electrodes; and a brightness control circuit

for controlling brightness. The brightness control circuit detects the phase difference between the secondary ac output and the primary ac input. When the detected phase difference is greater than a specified phase difference, the drive arrangement reduces the power of the primary ac input applied to the primary electrodes. If the detected phase difference is less than the specified phase difference, the drive arrangement increases the power of the primary ac input applied to the primary electrodes.

Fig. 1



EP 1 220 580 A3



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## EUROPEAN SEARCH REPORT

Application Number  
EP 01 13 0174

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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 27 May 2004	Examiner Villafuerte Abrego
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document		T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/02 (P04C01)



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# EUROPEAN SEARCH REPORT

Application Number  
EP 01 13 0174

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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (p04c01)



European Patent  
Office

Application Number  
EP 01 13 0174

#### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

#### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet 8

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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Office

LACK OF UNITY OF INVENTION  
SHEET B

Application Number  
EP 01 13 0174

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-17, 20-25, 28

A drive device and method for cold cathode lamps with a piezoelectric transformer and brightness control by: detecting a phase difference between the transformer voltages.

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2. claims: 18, 27

A drive device and method for cold cathode lamps with a piezoelectric transformer and brightness control by: detecting the secondary voltage and varying the oscillation frequency of the primary oscillator.

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3. claims: 19, 26

A drive device and method for cold cathode lamps with a piezoelectric transformer and brightness control by: detecting the secondary voltage and reducing/increasing the primary voltage.

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 13 0174

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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27-05-2004

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EPO FORM P0459

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